

## Unit 5 Instructional Strategies

Students can cover rectangular shapes with tiles and count the number of units (tiles) to begin developing the idea that area is a measure of covering. Area describes the size of an object that is two-dimensional. The formulas should not be introduced before students discover the meaning of area. The area of a rectangle can be determined by having students lay out unit squares and count how many square units it takes to completely cover the rectangle completely without overlaps or gaps. Students need to develop the meaning for computing the area of a rectangle. A connection needs to be made between the number of squares it takes to cover the rectangle and the dimensions of the rectangle. Ask questions such as:

- What does the length of a rectangle describe about the squares covering it?
- What does the width of a rectangle describe about the squares covering it?

The concept of multiplication can be related to the area of rectangles using arrays. Students need to discover that the length of one dimension of a rectangle tells how many squares are in each row of an array and the length of the other dimension of the rectangle tells how many squares are in each column. Ask questions about the dimensions if students do not make these discoveries.

For example:

- How do the squares covering a rectangle compare to an array?
- How is multiplication used to count the number of objects in an array?

Students should also make the connection of the area of a rectangle to the area model used to represent multiplication. Provide students with the area of a rectangle (i.e., 42 square inches) and have them determine possible lengths and widths of the rectangle. Expect different lengths and widths such as, 6 inches by 7 inches or 3 inches by 14 inches. Provide students with the area of a rectangle (i.e., 42 square inches) and have them determine possible lengths and widths of the rectangle. Expect different lengths and widths such as, 6 inches by 7 inches or 3 inches by 14 inches. Students have created rectangles before when finding the area of rectangles and connecting them to using arrays in the multiplication of whole numbers. To explore finding the perimeter of a rectangle, have students use non-stretchy string. They should measure the string and create a rectangle before cutting it into four pieces. Then, have students use four pieces of the non-stretchy string to make a rectangle. Two pieces of the string should be of the same length and the other two pieces should have a different length that is the same. Students should be able to make the connection that perimeter is the total distance around the rectangle. Geoboards can be used to find the perimeter of rectangles also. Provide students with different perimeters and have them create the rectangles on the geoboards. Have students share their rectangles with the class. Have discussions about how different rectangles can have the same perimeter with different side lengths. Students experienced measuring lengths of inches and centimeters in Grade 2. They have also related addition to length and writing equations with a symbol for the unknown to represent a problem. Once students know how to find the perimeter of a rectangle, they can find the perimeter of rectangular-shaped objects in their environment. They can use appropriate measuring tools to find lengths of rectangular-shaped objects in the classroom. Present problems situations involving perimeter, such as finding the amount of fencing needed to enclose a rectangular shaped park, or how much ribbon is needed to decorate the edges of a picture frame. Also present problem situations in which the perimeter and two or three of the side lengths are known, requiring students to find the unknown side length. Students need to know when a problem situation requires them to know that the solution relates to the perimeter or the area. They should have experience with understanding area concepts when they recognize it as an attribute of plane figures. They also discovered that when plane figures are covered without gaps by  $n$  unit squares, the area of the figure is  $n$  square units.

Students need to explore how measurements are affected when one attribute to be measured is held constant and the other is changed. Using square tiles, students can discover that the area of rectangles may be the same, but the perimeter of the rectangles varies. Geoboards can also be used to explore this same concept.